



All India Test Series (2023-24)

Test Code: ANY/06

AIMS TEST - 06

YAKEEN NEET

DURATION: 200 Minutes

DATE: 10/04/2024

M. MARKS: 720

ANSWER KEY

(PHYSICS)

SECTION-A

1. (4)	8. (2)	15. (1)	22. (4)	29. (4)
2. (3)	9. (2)	16. (4)	23. (2)	30. (3)
3. (2)	10. (4)	17. (4)	24. (2)	31. (2)
4. (2)	11. (4)	18. (3)	25. (4)	32. (3)
5. (4)	12. (1)	19. (3)	26. (3)	33. (2)
6. (4)	13. (3)	20. (2)	27. (2)	34. (3)
7. (3)	14. (1)	21. (2)	28. (1)	35. (4)

SECTION-B

36. (2)	39. (3)	42. (3)	45. (3)	48. (3)
37. (1)	40. (3)	43. (1)	46. (3)	49. (4)
38. (2)	41. (2)	44. (3)	47. (1)	50. (4)

(CHEMISTRY)

SECTION-A

51. (2)	58. (3)	65. (4)	72. (1)	79. (2)
52. (2)	59. (2)	66. (2)	73. (3)	80. (4)
53. (3)	60. (3)	67. (4)	74. (4)	81. (4)
54. (3)	61. (3)	68. (2)	75. (4)	82. (3)
55. (3)	62. (2)	69. (2)	76. (4)	83. (4)
56. (2)	63. (2)	70. (3)	77. (2)	84. (3)
57. (2)	64. (2)	71. (3)	78. (4)	85. (1)

SECTION-B

86. (1)	89. (2)	92. (2)	95. (2)	98. (4)
87. (2)	90. (4)	93. (1)	96. (2)	99. (2)
88. (4)	91. (2)	94. (1)	97. (3)	100. (1)

(BOTANY)

SECTION-A

101. (1)	108. (2)	115. (1)	122. (4)	129. (3)
102. (3)	109. (4)	116. (2)	123. (3)	130. (1)
103. (4)	110. (1)	117. (1)	124. (1)	131. (1)
104. (3)	111. (3)	118. (4)	125. (3)	132. (1)
105. (4)	112. (3)	119. (1)	126. (4)	133. (3)
106. (3)	113. (1)	120. (3)	127. (2)	134. (2)
107. (4)	114. (3)	121. (2)	128. (1)	135. (4)

SECTION-B

136. (2)	139. (3)	142. (2)	145. (2)	148. (3)
137. (3)	140. (3)	143. (1)	146. (4)	149. (2)
138. (2)	141. (2)	144. (1)	147. (2)	150. (2)

(ZOOLOGY)

SECTION-A

151. (4)	158. (3)	165. (4)	172. (1)	179. (2)
152. (1)	159. (2)	166. (1)	173. (2)	180. (2)
153. (1)	160. (2)	167. (1)	174. (3)	181. (1)
154. (2)	161. (3)	168. (3)	175. (3)	182. (4)
155. (3)	162. (3)	169. (3)	176. (3)	183. (1)
156. (4)	163. (2)	170. (1)	177. (3)	184. (2)
157. (2)	164. (2)	171. (1)	178. (4)	185. (2)

SECTION-B

186. (2)	189. (2)	192. (3)	195. (2)	198. (3)
187. (3)	190. (4)	193. (4)	196. (2)	199. (3)
188. (3)	191. (1)	194. (1)	197. (4)	200. (4)

Hints & Solutions

[AITS-06 | Dropper-NEET | 10-04-2024]

(PHYSICS)

SECTION-A

1. (4)

- If $\mu_l < \mu_m$, concave lens behave as a converging lens and convex lens behave as a diverging lens.
- If $\mu_l > \mu_m$, concave lens behave as a diverging lens and convex lens behave as a converging lens.
- If $\mu_l = \mu_m$, no bending or refraction occur. Ray passes undeviated.

(NEW NCERT 12th Page No. 235, 236)

2. (3)

All colours of white light have zero path difference at C, so all colours will form maxima at C. When they combine, a bright white spot is formed.

(NEW NCERT 12th Page No. 265)

3. (2)

Angular momentum of electron is integral multiple of $\frac{h}{2\pi}$.

$$L = \frac{nh}{2\pi}$$

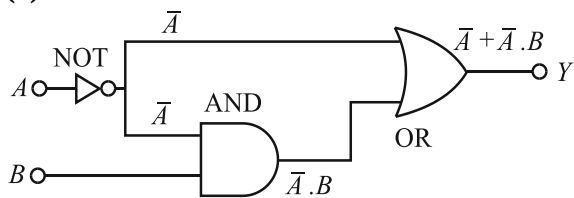
for $n = 2$, $L = \frac{h}{\pi}$

for $n = 4$, $L = \frac{2h}{\pi}$

for $n = 10$, $L = \frac{5h}{\pi}$

(NEW NCERT 12th Page No. 299)

4. (2)



$$Y = \bar{A}.B + \bar{A} = \bar{A}.(B+1) = \bar{A}.1 = \bar{A}$$

(OLD NCERT 12th Page No. 492, 493)

5. (4)

$$Q_f = \frac{V_C}{V_R} = \frac{\left(i \times \frac{1}{\omega_0 C}\right)}{iR} = \frac{1}{\omega_0 CR}$$

$$Q_f = \frac{V_L}{V_R} = \frac{(i \times \omega_0 L)}{iR} = \frac{\omega_0 L}{R}$$

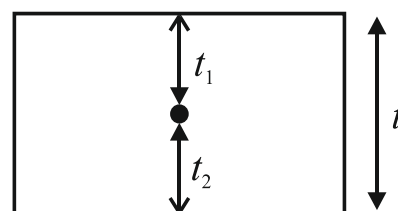
(NEW NCERT 12th Page No. 189)

6. (4)

The induced emf is to be constant only in the case of the rectangular loop. In the case of circular loop and triangular loop, the rate of change of area of the loop during its passage out of the field region is not constant, hence induced emf will vary accordingly in them.

(NEW NCERT 12th Page No. 161)

7. (3)



$$\mu = \frac{\text{Real depth}}{\text{Apparent depth}}$$

$$\text{Real depth} = \text{Apparent depth} \times \mu$$

$$t = t_1 + t_2$$

$$t = 5 \times 1.5 + 2 \times 1.5 = 10.5 \text{ cm}$$

(NEW NCERT 12th Page No. 228, 229)

8. (2)

$$\begin{aligned} (K.E)_{\max} &= q\Delta V = e(Ed) \\ &= e(4 \times 1) \\ &= 4 \text{ eV} \end{aligned}$$

$$\text{Energy of incident photon} = \frac{1240}{200} = 6.2 \text{ eV}$$

$$\phi = 6.2 - 4 = 2.2 \text{ eV}$$

(NEW NCERT 12th Page No. 281)

9. (2)

$$i = \frac{e}{T}$$

$$T = \frac{1}{f}$$

$$f \propto \omega$$

$$\omega_n = \frac{v_n}{r_n}$$

$$\omega_n \propto \frac{Z^2}{n^3}$$

$$\text{so, } T \propto \frac{n^3}{Z^2}, \text{ hence } i \propto \frac{Z^2}{n^3}$$

$$\frac{i_1}{i_2} = \frac{(3)^2}{(1)^3} \times \frac{(2)^3}{(3)^2} = \frac{8}{1}$$

(NEW NCERT 12th Page No. 298, 299)

10. (4)

If $m = +4$

$$m = \frac{f}{f - u}$$

$$4 = \frac{-10}{-10 - u}$$

$$-40 - 4u = -10$$

$$4u = -30, u = \frac{-15}{2} \text{ cm}$$

If $m = -4$

$$-4 = \frac{-10}{-10 - u}$$

$$40 + 4u = -10, -50 = 4u$$

$$u = \frac{-25}{2} \text{ cm}$$

(NEW NCERT 12th Page No. 225)

11. (4)

Conditions for constructive interference (Maxima):

$$\text{Phase difference} = 2n\pi$$

$$\text{Path difference} = n\lambda$$

Where $n = 0, 1, 2, \dots$

Conditions for destructive interference (Minima):

$$\text{Phase difference} = (2n - 1)\pi$$

$$\text{Path difference} = (2n - 1) \frac{\lambda}{2}$$

Where $n = 1, 2, 3, \dots$

(NEW NCERT 12th Page No. 263, 264)

12. (1)

$$\text{Angular width of central maxima} = \frac{2\lambda}{a}$$

$$\theta = \frac{2 \times 6328 \times 10^{-10}}{0.2 \times 10^{-3}}$$

$$= 6.328 \times 10^{-3} \text{ radian}$$

$$= \frac{6.328 \times 10^{-3} \times 180}{\pi} = 0.36^\circ$$

(NEW NCERT 12th Page No. 266, 267)

13. (3)

$$\phi = h\nu_0$$

$$\nu_0 = \frac{\phi}{h}$$

$$\frac{\phi}{h} = 1 \times 10^{14} \text{ s}^{-1}$$

(NEW NCERT 12th Page No. 279)

14. (1)

$$R = \frac{mv}{qB}$$

$$v = \frac{qBR}{m}$$

$$\lambda = \frac{h}{P} = \frac{h}{mv} = \frac{h}{\frac{mqBR}{m}} = \frac{h}{qBR}$$

(NEW NCERT 12th Page No. 285)

15. (1)

$$U = -\vec{M} \cdot \vec{B} = -MB \cos \theta$$

Potential energy will be minimum, if $\theta = 0^\circ$

$$U_{\min} = -MB$$

(NEW NCERT 12th Page No. 139)

16. (4)

$$P_i = V_i \times I_i$$

$$5000 = 200 \times I_i$$

$$I_i = 25 \text{ A}$$

$$\eta = \frac{P_0}{P_i},$$

$$P_0 = 0.70 \times 5000$$

$$P_0 = 3500 \text{ watt}$$

$$3500 = V_0 \times I_0$$

$$V_0 = \frac{3500}{2} = 1750 \text{ volt}$$

(NEW NCERT 12th Page No. 194)

17. (4)

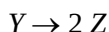
$$e = B \times l_{\text{eff}} \times v \times \sin \theta$$

$$l_{\text{eff}} = 2R$$

$$e = Bv(2R) \sin \theta$$

(NEW NCERT 12th Page No. 162)

18. (3)



$$\text{Reactant: } E_1 = 60 \times 8.5 = 510 \text{ MeV}$$

$$\text{Product: } E_2 = 2 \times 30 \times 5 = 300 \text{ MeV}$$

$$\Delta E = -210 \text{ MeV, Endothermic}$$

$$W \rightarrow Y + Z$$

$$\text{Reactant: } E_1 = 120 \times 7.5 = 900 \text{ MeV}$$

$$\text{Product: } E_2 = 60 \times 8.5 + 30 \times 5 = 660 \text{ MeV}$$

$$\Delta E = -240 \text{ MeV, Endothermic}$$

$$W \rightarrow 2 Y$$

$$\text{Reactant: } E_1 = 120 \times 7.5 = 900 \text{ MeV}$$

$$\text{Product: } E_2 = 2 \times 60 \times 8.5 = 1020 \text{ MeV}$$

$$\Delta E = 120 \text{ MeV, Exothermic}$$

$$X \rightarrow Y + Z$$

$$\text{Reactant: } E_1 = 90 \times 8.0 = 720 \text{ MeV}$$

$$\text{Product: } E_2 = 60 \times 8.5 + 30 \times 5 = 660 \text{ MeV}$$

$$\Delta E = -60 \text{ MeV, Endothermic}$$

(NEW NCERT 12th Page No. 312, 313)

19. (3)

$$E_g \leq \frac{hc}{\lambda}$$

$$\lambda \leq \frac{hc}{E_g}$$

$$\Rightarrow \lambda_{\max} = \frac{hc}{E_g} \approx \frac{12400}{2} \text{ \AA} \approx 6200 \text{ \AA}$$

(OLD NCERT 12th Page No. 487)

20. (2)

$$Z = \sqrt{X_L^2 + R^2} = \sqrt{(2\pi fL)^2 + R^2}$$

$$= \sqrt{(2\pi \times 50 \times 0.7)^2 + (220)^2}$$

$$= \sqrt{(220)^2 + (220)^2} = 220\sqrt{2}$$

$$\cos \phi = \frac{R}{Z} = \frac{220}{220\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$\phi = 45^\circ$$

$$\sin \phi = \frac{1}{\sqrt{2}}$$

$$I_{\text{wattless}} = I_{\text{rms}} \times \sin \phi = I_{\text{rms}} \times \frac{1}{\sqrt{2}}$$

$$= \frac{V_{\text{rms}}}{Z} \times \frac{1}{\sqrt{2}}$$

$$= \frac{220}{220\sqrt{2}} \times \frac{1}{\sqrt{2}} = \frac{1}{2}$$

(NEW NCERT 12th Page No. 191, 192)

21. (2)

$$\delta_{\min} = (\mu - 1)A$$

$$\mu - 1 = \frac{\delta_{\min}}{A} = \frac{3.2}{4} = \frac{4}{5}$$

(NEW NCERT 12th Page No. 239)

22. (4)

$$\phi = \vec{B} \cdot \vec{A}$$

$$= (\mu H)A$$

$$\mu = \frac{\phi}{HA} = \frac{4 \times 10^{-5}}{500 \times 0.5 \times 10^{-4}}$$

$$\mu = 1.6 \times 10^{-3} \text{ H/m}$$

(NEW NCERT 12th Page No. 145, 146)

23. (2)

$$\text{Resultant intensity } I = I_0 \cos^2 \left(\frac{\phi}{2} \right)$$

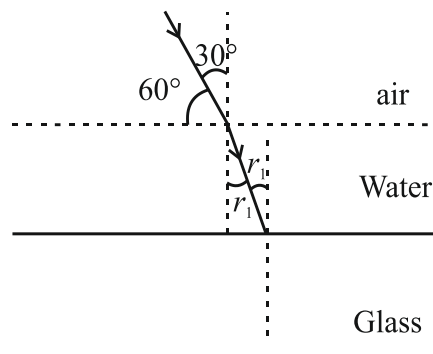
$$\Delta \phi = \frac{2\pi}{\lambda} \cdot \Delta x = \frac{2\pi}{\lambda} \times \frac{\lambda}{2} = \pi$$

$$\text{Now, } I = I_0 \cos^2 \left(\frac{\pi}{2} \right)$$

$$I = 0$$

(NEW NCERT 12th Page No. 265)

24. (2)



$$\sin 30^\circ = \mu_w \times \sin r_1$$

$$\frac{1}{2} = \frac{4}{3} \sin r_1$$

$$\sin r_1 = \frac{3}{8}$$

$$r_1 = \sin^{-1} \left(\frac{3}{8} \right)$$

(NEW NCERT 12th Page No. 228, 229)

25. (4)

In space, all rays travel with same speed.

(NEW NCERT 12th Page No. 207)

26. (3)

$$n_i^2 = n_e \times n_h$$

$$n_i = 1.5 \times 10^{16}$$

$$n_h = 4.5 \times 10^{22}$$

$$n_e = \frac{n_i^2}{n_h}$$

$$n_e = 5 \times 10^9 \text{ m}^{-3}$$

(NEW NCERT 12th Page No. 332)

27. (2)

$$E_n = -\frac{13.6}{n^2} \text{ eV}$$

for 2nd excited state, $n = 3$

$$E_3 = -\frac{13.6}{(3)^2} \text{ eV}$$

$$= -1.51 \text{ eV}$$

$$\text{P.E} = -2 E_3 = -3.02 \text{ eV}$$

(NEW NCERT 12th Page No. 299)

28. (1)

$$\frac{hc}{\frac{\lambda}{2}} = E + \phi$$

$$E = \frac{2hc}{\lambda} - \phi \quad \dots (1)$$

$$\frac{hc}{\frac{\lambda}{3}} = 2E + \phi$$

$$\frac{3hc}{\lambda} = 2\left(\frac{2hc}{\lambda} - \phi\right) + \phi$$

$$\phi = \frac{hc}{\lambda}$$

(NEW NCERT 12th Page No. 281, 282)

29. (4)

$$\vec{F} = i(\vec{l} \times \vec{B})$$

$$= i(\vec{L}_{AB} \times \vec{B})$$

$$L_{AB} = 3a$$

$$\vec{F} = i\left[(3a\hat{i}) \times (B_0\hat{i})\right] = 0$$

(NEW NCERT 12th Page No. 123)

30. (3)

$$R = R_0 A^{\frac{1}{3}}$$

$$R_{Al} = R_0 (27)^{\frac{1}{3}} = 3R_0 \quad \dots (i)$$

$$R_{Te} = R_0 (125)^{\frac{1}{3}} = 5R_0 \quad \dots (ii)$$

$$\frac{R_{Te}}{R_{Al}} = \frac{5R_0}{3R_0}$$

$$R_{Te} = \frac{5}{3} R_{Al}$$

(NEW NCERT 12th Page No. 309)

31. (2)

If P side is at higher potential than n side of $p-n$ junction, then diode is not in reversed biased condition.

In option 2, P side potential ($-1V$) is higher than n side potential ($-3V$).

(NEW NCERT 12th Page No. 335)

32. (3)

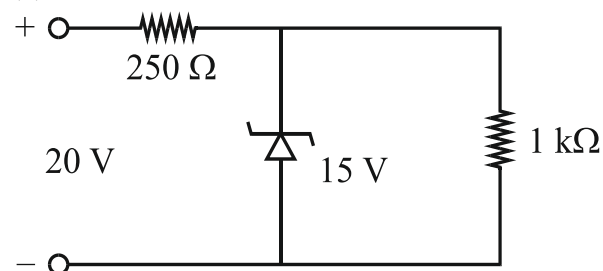
$$p = \left(\frac{n}{t}\right) h\nu$$

$$p = \left(\frac{n}{t}\right) \frac{hc}{\lambda}$$

$$\frac{n}{t} = \frac{p\lambda}{hc} = \frac{60 \times 10^{-3} \times 6000 \times 10^{-10}}{(6.626 \times 10^{-34}) \times 3 \times 10^8} = 1.8 \times 10^{17}$$

(NEW NCERT 12th Page No. 283)

33. (2)



Potential through zener diode is maintained at 15 V.

$$\text{Current through } 1000 \Omega = \frac{15}{1000} = 0.015 \text{ A}$$

$$\text{Current through } 250\Omega = \frac{20-15}{250} = \frac{1}{50} = 0.02 \text{ A}$$

$$\therefore \text{Current through diode} = 0.02 - 0.015 = 0.005 \text{ A}$$

(OLD NCERT 12th Page No. 486)

34. (3)

$$r = \frac{mv}{qB} = \frac{p}{qB} = \frac{\sqrt{2mE}}{qB}$$

q, E and B are same for both particle

$$\frac{r_1}{r_2} = \frac{\sqrt{m_1}}{\sqrt{m_2}}$$

$$\frac{m_1}{m_2} = \left(\frac{r_1}{r_2}\right)^2$$

(NEW NCERT 12th Page No. 112)

35. (4)

$$E = -13.6 \frac{Z^2}{n^2} \text{ eV}$$

$$E_1 = \frac{-13.6(3)^2}{(1)^2} = -122.4 \text{ eV}$$

Ionization energy of an electron = + 122.4 eV

(NEW NCERT 12th Page No. 296)

SECTION-B

36. (2)

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{v}{f} = 1 - \frac{v}{u} = 1 - m$$

$$m = 1 - \frac{v}{f} \quad \dots (i)$$

$$y = Mx + c \quad \dots (ii)$$

compare (i) and (ii)

$$\text{slope } M = -\frac{1}{f}$$

$$\frac{\delta}{\beta} = -\frac{1}{f}$$

$$f = -\frac{\beta}{\delta}$$

$$|2f| = \frac{2\beta}{\delta}$$

(NEW NCERT 12th Page No. 234, 235)

37. (1)

At distance of closest approach, kinetic energy of the particle will be completely converted into electrostatic potential energy.

$$\frac{1}{2}mv^2 = \frac{K(2e)(Ze)}{d_{\min}}$$

$$d_{\min} = \frac{(2KZe^2) \times 2}{mv^2}$$

$$= \frac{4KZe^2}{mv^2}$$

(NEW NCERT 12th Page No. 307, 308)

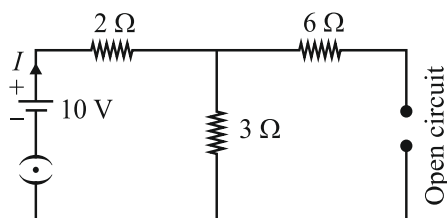
38. (2)

- If any key from A and B is closed (on condition), bulb will glow.
- If both keys are closed (on condition), bulb will not glow.
- If both keys are open (off condition), bulb will glow.

(OLD NCERT 12th Page No. 491, 492)

39. (3)

Just after closing the key, inductor behave as open circuit.



$$R_{\text{net}} = 2 + 3 = 5 \Omega$$

$$I = \frac{V}{R} = \frac{10}{5} = 2 \text{ A}$$

(NEW NCERT 12th Page No. 168)

40. (3)

Magnetic field along the axis of wire length is zero. Points P and Q lies on axis of wire.

(NEW NCERT 12th Page No. 113, 114)

41. (2)

For dark fringe, path difference = $\frac{(2n-1)\lambda}{2}$

$$SS_1P - SS_2P = \frac{(2n-1)\lambda}{2}$$

$$(l_1 + l_3) - (l_2 + l_4) = \frac{(2n-1)\lambda}{2}$$

$$(l_1 - l_2) + (l_3 - l_4) = \frac{(2n-1)\lambda}{2}$$

(NEW NCERT 12th Page No. 262, 263)

42. (3)

$$\lambda = \frac{12.27}{\sqrt{V}} \text{ \AA}$$

$$V = 36 - 20 = 16 \text{ volt}$$

$$\lambda = \frac{12.27}{\sqrt{16}}$$

$$= 3.1 \text{ \AA}$$

(NEW NCERT 12th Page No. 285)

43. (1)

$$\text{Dynamic resistance} = \frac{\Delta V}{\Delta I}$$

$$R_d = \frac{0.9 - 0.8}{(30 - 25) \times 10^{-3}} = \frac{0.1}{5 \times 10^{-3}}$$

$$= 20 \Omega$$

(NEW NCERT 12th Page No. 337)

44. (3)

$$\begin{aligned} \text{Number of atoms in 2 kg fuel} &= \frac{2000}{235} \times 6.02 \times 10^{23} \\ &= 5.1 \times 10^{24} \end{aligned}$$

$$\begin{aligned} \text{Number of fission reaction in 1 second} &= \frac{5.1 \times 10^{24}}{30 \times 24 \times 60 \times 60} \\ &= 1.96 \times 10^{18} \end{aligned}$$

$$\begin{aligned} \text{Power output} &= 185 \times 10^6 \times 1.6 \times 10^{-19} \times 1.96 \times 10^{18} \\ &= \approx 58 \text{ MW} \end{aligned}$$

(NEW NCERT 12th Page No. 315, 316)

45. (3)

- At polarizing angle, refracted light is partially polarized and reflected light is fully polarised.
- Reflected and refracted rays are perpendicular to each other.

(NEW NCERT 12th Page No. 269)

46. (3)

$$i_{rms} = \sqrt{\langle i^2 \rangle}$$

$$\langle i^2 \rangle = \frac{\int_0^3 \left(\frac{i_0 t^2}{3} \right)^2 dt}{\int_0^3 dt}$$

$$= \frac{\int_0^3 \frac{i_0^2}{9} \times t^4 dt}{3}$$

$$= \frac{i_0^2}{27} \left(\frac{t^5}{5} \right)_0^3$$

$$= \frac{9}{5} i_0^2$$

$$i_{rms} = \sqrt{\frac{9}{5} i_0^2}$$

$$= \frac{3}{\sqrt{5}} i_0$$

(NEW NCERT 12th Page No. 179)

47. (1)

$$f_o = F_1$$

$$f_e = F_2$$

$$|m| = \left| \frac{f_o}{f_e} \right| = \frac{F_1}{F_2}$$

(NEW NCERT 12th Page No. 245)

48. (3)

$$\frac{1}{\lambda} = R \left(\frac{1}{n_f^2} - \frac{1}{n_i^2} \right)$$

For longest wavelength, $n_i = 2$, $n_f = 1$

$$\frac{1}{\lambda_1} = R \left(\frac{1}{1^2} - \frac{1}{2^2} \right) = \frac{3R}{4} \quad \dots(i)$$

For shortest wavelength, $n_i = \infty$, $n_f = 1$

$$\frac{1}{\lambda_2} = R \left(\frac{1}{1^2} - \frac{1}{\infty^2} \right) = R \quad \dots(ii)$$

$$\frac{\lambda_1}{\lambda_2} = \frac{R}{\frac{3R}{4}}$$

$$= \frac{4}{3}$$

(NEW NCERT 12th Page No. 300)

49. (4)

$$E_0 = cB_0$$

$$= 3 \times 10^8 \times 40 \times 10^{-9}$$

$$= 12 \text{ V/m}$$

(NEW NCERT 12th Page No. 207)

50. (4)

$$B = \frac{\mu_0 i R^2}{2(R^2 + x^2)^{\frac{3}{2}}}$$

At $x = 0$,

$$B_1 = \frac{\mu_0 i R^2}{2R^3} = \frac{\mu_0 i}{2R}$$

At $x = \sqrt{3}R$

$$B_2 = \frac{\mu_0 i R^2}{2(R^2 + 3R^2)^{\frac{3}{2}}}$$

$$= \frac{\mu_0 i R^2}{2 \times 8R^3}$$

$$= \frac{\mu_0 i}{16R}$$

$$= \frac{B_1}{B_2} = \frac{8}{1}$$

(NEW NCERT 12th Page No. 116)

So, the atomic weight of P is 10.5

Atomic weight of P = atomic weight of Q $\times$ 0.05

$$\text{Atomic weight of Q} = \frac{\text{Atomic weight of P}}{0.05}$$

Now we can substitute the value we get,

$$\text{Atomic weight of Q} = \frac{10.5}{0.05} = 210$$

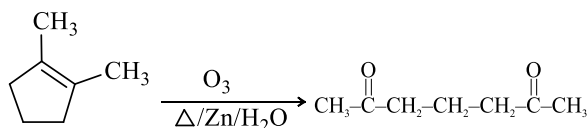
Hence, Sum of atomic mass of P and Q

$$= 10.5 + 210$$

$$= 220.5 \text{ gm}$$

(NEW NCERT 11th Part-I Page No. 20)

58. (3)



(NEW NCERT 11th Part-II Page No. 313)

59. (2)

$\text{N}_2\text{O} \rightarrow$ colourless gas, neutral

$\text{NO}_2 \rightarrow$ brown gas, acidic

$\text{NO} \rightarrow$ colourless gas, neutral

$\text{N}_2\text{O}_3 \rightarrow$ blue solid, acidic

(OLD NCERT 11th Part-I Page No. 172)

60. (3)

Vitamin B₁₂ is water soluble vitamin but it can be stored in our body.

(NEW NCERT 12th Part-II Page No. 296)

61. (3)

$\text{Gd}^{+3} = [\text{Xe}]4f^7$ [half-filled and stable]

$\text{Yb}^{+3} = [\text{Xe}]4f^{13}$

$\text{Eu}^{+3} = [\text{Xe}]4f^6$

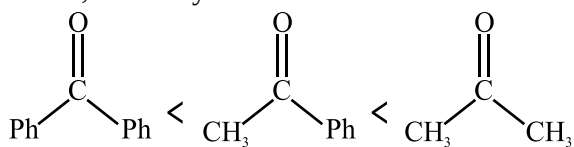
$\text{Lu}^{+3} = [\text{Xe}]4f^{14}$ [full-filled and stable]

(NEW NCERT 12th Part-I Page No. 110)

62. (2)

The reactivity of carbonyl compound towards nucleophilic addition of Grignard's reagent depends on extent of steric hindrance at α -carbon. Greater the steric hindrance, smaller the reactivity.

Hence, reactivity order is:



(NEW NCERT 12th Part-II Page No. 201)

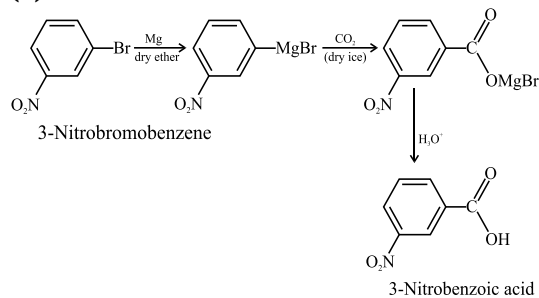
63. (2)

In gaseous state, amines follow this basicity order: $3^\circ > 2^\circ > 1^\circ > \text{NH}_3$.

Hence, $(\text{C}_2\text{H}_5)_3\text{N}$ will be most basic among all.

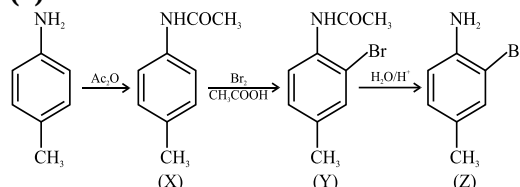
(NEW NCERT 12th Part-II Page No. 268)

64. (2)



(NEW NCERT 12th Part-II Page No. 248)

65. (4)



(NEW NCERT 12th Part-II Page No. 278)

66. (2)

$[\text{CoCl}_6]^{4-}$ is an octahedral complex

$[\text{CoCl}_4]^{2-}$ is a tetrahedral complex

$$\Delta_{\text{octahedral}} = 3.6 \times 10^3 \text{ cm}^{-1}$$

$$\Delta_{\text{tetrahedral}} = \frac{4}{9} \Delta_{\text{octahedral}}$$

$$= \frac{4}{9} \times 3.6 \times 10^3 \text{ cm}^{-1} = 1600 \text{ cm}^{-1}$$

(NEW NCERT 12th Part-I Page No. 131)

67. (4)

Nitrogen is estimated by Dumas or Kjeldahl's method and halogens by Carius method.

(NEW NCERT 11th Part-II Page No. 291)

68. (2)

Ionic conductivity depends upon the number of ions produced in aqueous solution. Greater the number of ions more will be its ionic conductivity.

(1) $[\text{Ni}(\text{CO})_4] \rightarrow$ zero ion

(2) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3 \rightarrow$ four ion

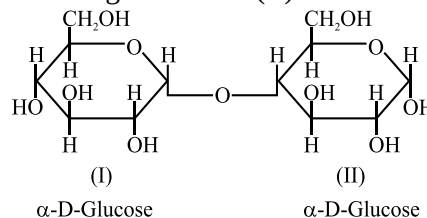
(3) $[\text{Fe}(\text{H}_2\text{O})_6]\text{SO}_4 \rightarrow$ two ion

(4) $[\text{Cu}(\text{NH}_3)_4](\text{NO}_3)_2 \rightarrow$ three ion

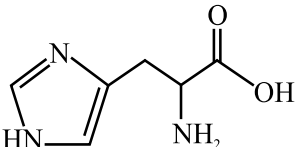
(NEW NCERT 12th Part-I Page No. 23)

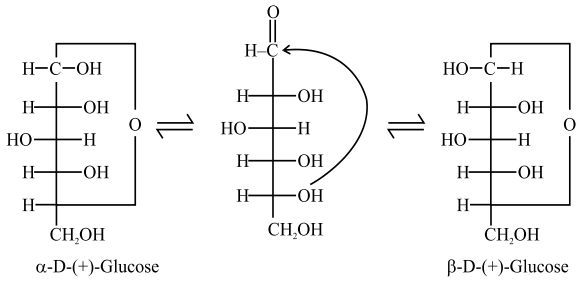
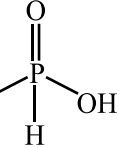
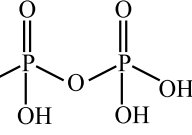
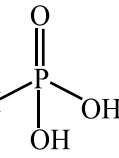
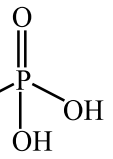
69. (2)

Maltose is composed of two α -D-glucose units in which C₁ of one glucose (I) is linked to C₄ of another glucose unit (II).



(NEW NCERT 12th Part-II Page No. 287)

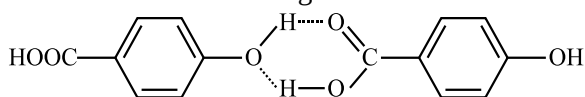
70. (3)
The order of the second ionisation enthalpy is:
 $\text{Ti} < \text{V} < \text{Mn} < \text{Cr}$.
(NEW NCERT 12th Part-I Page No. 94)
71. (3)
On treating sodium fusion extract with sodium nitroprusside, appearance of a violet colour indicates the presence of sulphur.
 $\text{S}^{2-} + [\text{Fe}(\text{CN})_5\text{NO}]^{2-} \rightarrow [\text{Fe}(\text{CN})_5\text{NOS}]^{4-}$
(NEW NCERT 11th Part-II Page No. 285)
72. (1)
 $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ has Co^{+3} which has d^6 configuration and H_2O act as a weak field ligand.
Hence, $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ will have $t_{2g}^4 e_g^2$ configuration.
(NEW NCERT 12th Part-I Page No. 131)
73. (3)
Histidine is basic amino acid and contains imidazole ring.
- 
- (NEW NCERT 12th Part-II Page No. 291)
74. (4)
Only Nitrogen, sulphur, halogens and phosphorus present in an organic compound can be detected by "Lassaigne's test".
(NEW NCERT 11th Part-II Page No. 284)
75. (4)
Pentaamminenitrocobalt(III)Chloride is $[\text{Co}(\text{NH}_3)_5\text{NO}_2]\text{Cl}_2$ which shows linkage isomerism. Isomer of $[\text{Co}(\text{NH}_3)_5\text{NO}_2]\text{Cl}_2$ is $[\text{Co}(\text{NH}_3)_5\text{ONO}]\text{Cl}_2$.
(NEW NCERT 12th Part-I Page No. 125)
76. (4)
(I) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
 $\text{Fe}^{2+} : d^6$ $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$ (4 unpaired electrons)
(II) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$
 $\text{Ni}^{2+} : d^8$ $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow$ (2 unpaired electrons)
(III) $[\text{Cu}(\text{CN})_4]^{2-}$
 $\text{Cu}^{+2} : d^9$ $\uparrow\downarrow\uparrow\downarrow\uparrow\downarrow\uparrow$ (1 unpaired electrons)
(IV) $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$
 $\text{Mn}^{2+} : d^5$ $\uparrow\uparrow\uparrow\uparrow\uparrow$ (5 unpaired electrons)
Hence, maximum magnetic moment is shown by $[\text{Mn}(\text{H}_2\text{O})_6]^{2+}$.
(NEW NCERT 12th Part-I Page No. 101)

77. (2)
- 
- $\alpha\text{-D-(+)-Glucose}$ $\rightleftharpoons$ $\beta\text{-D-(+)-Glucose}$
- The two cyclic hemiacetal forms of glucose differ in the configuration of the hydroxyl group at 1st carbon. Hence, they are anomers of each other.
(NEW NCERT 12th Part-II Page No. 285)
78. (4)
- Phosphinic acid $\rightarrow$ 
- Pyrophosphoric acid $\rightarrow$ 
- Phosphonic acid $\rightarrow$ 
- Orthophosphoric acid $\rightarrow$ 
- (OLD NCERT 12th Part-I Page No. 179)
79. (2)
 MnO_4^- is tetrahedral, diamagnetic and purple colour compound. This colour is due to charge transfer spectra.
 MnO_4^{2-} is tetrahedral, has green colour and paramagnetic because of one unpaired electron.
(NEW NCERT 12th Part-I Page No. 107)
80. (4)
If temperature is increased, reaction will go backward and hence, decrease the concentration of SO_3 .
(NEW NCERT 11th Part-I Page No. 185)
81. (4)
Melting point of trans-isomer is more than that of cis-isomer.
(NEW NCERT 11th Part-II Page No. 270)

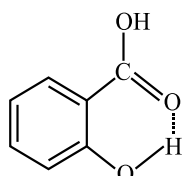
82. (3)
 $\text{POCl}_3 - \text{sp}^3$
 $\text{SeCl}_4 - \text{sp}^3\text{d}$
 $\text{NO}_2^+ - \text{sp}$
 $\text{NO}_2^- - \text{sp}^2$
 (NEW NCERT 11th Part-I Page No. 120)

83. (4)
 The IUPAC name will be 2-cyclopropylbutane.
 (NEW NCERT 11th Part-II Page No. 262)

84. (3)
 p-Hydroxybenzoic acid has higher boiling point than o-Hydroxybenzoic acid because p-Hydroxybenzoic acid prefers intermolecular H-bonding while o-Hydroxybenzoic acid prefers intramolecular H-bonding.



intermolecular H-bonding



intramolecular H-bonding

(NEW NCERT 12th Part-II Page No. 249)

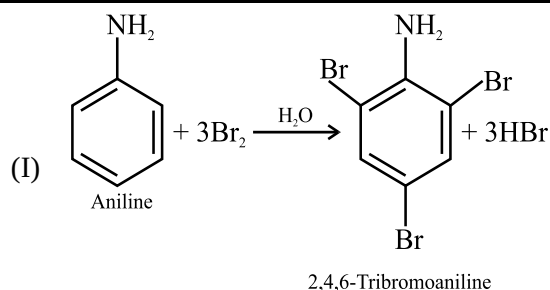
85. (1)
 Statement-I: Density of iodopropane is more than chloropropane. The density increases with increase in number of carbon atoms, halogen atoms and atomic mass of the halogen atoms.
 Statement-II: The boiling points of isomeric haloalkanes decrease with increase in branching, 2-Bromo-2-methylpropane has the lowest boiling point among the three isomers.

(NEW NCERT 11th Part-II Page No. 316)

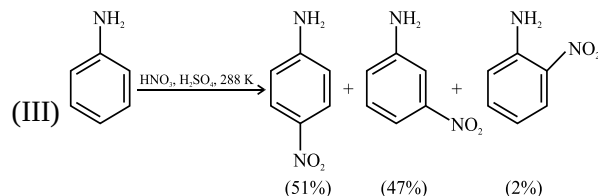
SECTION-B

86. (1)
 Molar mass of $\text{AgBr} = 108 + 80 = 188 \text{ g mol}^{-1}$
 188 g AgBr contains 80 g bromine
 100 g AgBr contains $\frac{80 \times 100}{188}$ g bromine
 Percentage of bromine = $\frac{80 \times 100 \times 100}{188 \times 500} = 8.51\%$
 (NEW NCERT 11th Part-II Page No. 289)

87. (2)



- (II) Aniline does not undergo Friedel-Crafts reaction (alkylation and acetylation) due to salt formation with aluminum chloride.

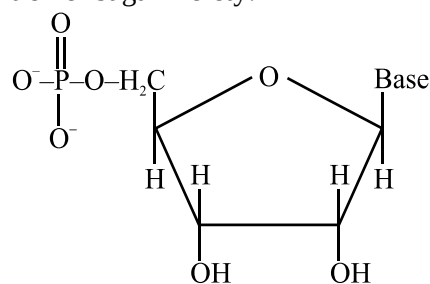


(NEW NCERT 12th Part-II Page No. 272)

88. (4)
 Zn is not a transition metal.
 (NEW NCERT 12th Part-I Page No. 94)

89. (2)
 $[\text{Cr}(\text{NH}_3)_6]^{3+} \rightarrow d^2\text{sp}^3 \Rightarrow \% s = 0.16\%$
 $[\text{Ni}(\text{CN})_4]^{2-} \rightarrow \text{dsp}^2 \Rightarrow \% s = 0.25\%$
 $[\text{Zn}(\text{NH}_3)_6]^{2+} \rightarrow \text{sp}^3\text{d}^2 \Rightarrow \% s = 0.16\%$
 $[\text{Ni}(\text{NH}_3)_6]^{2+} \rightarrow \text{sp}^3\text{d}^2 \Rightarrow \% s = 0.16\%$
 (NEW NCERT 12th Part-I Page No. 132)

90. (4)
 Nucleoside is linked to phosphoric acid at 5th position of sugar moiety.

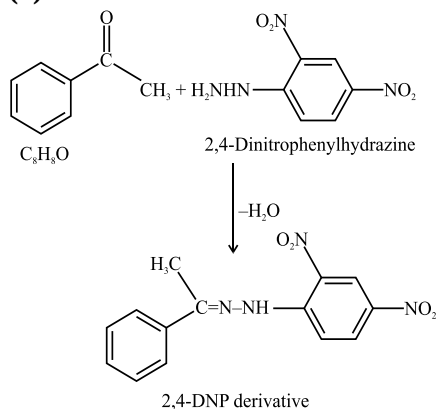


(NEW NCERT 12th Part-II Page No. 298)

91. (2)
 (I) Hydrolysis of XeF_6 gives XeOF_4 and XeO_2F_2 where the oxidation state of Xe remains same. Hence, no redox reaction will occur.
 (II) $6\text{XeF}_4 + 12\text{H}_2\text{O} \rightarrow 4\text{Xe} + 2\text{XeO}_3 + 24\text{HF} + 3\text{O}_2$
 (III) $\text{XeF}_4 + \text{SbF}_5 \rightarrow [\text{XeF}_3]^+[\text{SbF}_6]^-$
 (IV) Both XeO_3 and XeO_4 have tetrahedral geometry.

(OLD NCERT 12th Part-I Page No. 205)

92. (2)



(NEW NCERT 12th Part-II Page No. 240)

93. (1)

Aldehydes lacking presence of α -H undergo Cannizzaro reaction. When treated with conc. base, $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$ does not undergo Cannizzaro reaction because it has α -H.

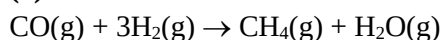
(NEW NCERT 12th Part-II Page No. 242)

94. (1)

$-\text{NO}_2$ will impart maximum $-\text{R}$ effect which increases the acidity to the maximum among all.

(NEW NCERT 12th Part-II Page No. 249)

95. (2)



$$\Delta n_g = 2 - 4 = -2$$

$$\text{Thus, } \Delta H = \Delta U + \Delta n_g RT$$

$$\Delta H = \Delta U - 2RT$$

$$\Rightarrow \Delta H < \Delta U$$

(NEW NCERT 11th Part-I Page No. 143)

96. (2)

Strength of the double bond (bond enthalpy, 681 kJ mol^{-1}) is greater than that of a carbon-carbon single bond in ethane (bond enthalpy, 348 kJ mol^{-1}).

(NEW NCERT 11th Part-II Page No. 315)

97. (3)

For $n = 4$, we have $l = 0, 1, 2, 3$

Only $l = 2, 3$ have value of $m = -2$ in it thus,

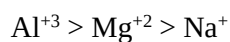
electron associated with these value having $s = -\frac{1}{2}$

will be only 2.

(NEW NCERT 11th Part-I Page No. 47)

98. (4)

The correct order of hydration energy is:



Hydration energy depends on charge of ion. Higher the charge, greater the hydration energy.

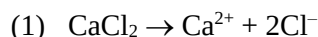
(NEW NCERT 11th Part-I Page No. 87)

99. (2)

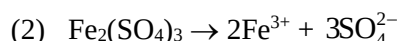
$$T_b - T_b^0 = im$$

$$T_b \propto im$$

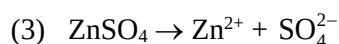
Higher the value of im , higher will be its boiling point.



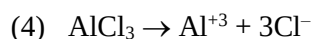
$$\text{value of } im = 3 \times 0.03 = 0.09$$



$$\text{value of } im = 5 \times 0.05 = 0.25$$



$$\text{value of } im = 2 \times 0.01 = 0.02$$



$$\text{value of } im = 4 \times 0.06 = 0.24$$

(NEW NCERT 12th Part-I Page No. 16)

100. (1)

$$\text{Specific resistance} = (a + b)$$

$$\text{Specific conductance} = \frac{1}{(a + b)}$$

$$\text{Molarity} = (a - b)$$

$$\text{Molar conductivity} = \frac{\text{Specific conductance} \times 1000}{\text{Molarity}}$$

$$\text{Molar conductivity} = \frac{\left(\frac{1}{a + b}\right) \times 1000}{(a - b)}$$

$$= \frac{1000}{(a + b)(a - b)}$$

$$= \frac{1000}{a^2 - b^2}$$

(NEW NCERT 12th Part-I Page No. 45)

(BOTANY)**SECTION-A****101. (1)**

In general, species diversity decreases as we move away from the equator towards the poles. With very few exceptions, tropics (latitudinal range of 23.5° N to 23.5° S) harbour more species than temperate or polar areas.

(NEW NCERT 12th Page No. 219)**102. (3)**

If you analyse the species-area relationships among very large areas like the entire continents, you will find that the slope of the line to be much steeper (Z values in the range of 0.6 to 1.2).

(NEW NCERT 12th Page No. 220)**103. (4)**

A stable community should not show too much variation in productivity from year to year; it must be either resistant or resilient to occasional disturbances (natural or man-made), and it must also be resistant to invasions by alien species. We don't know how these attributes are linked to species richness in a community, but David Tilman's long-term ecosystem experiments using outdoor plots provide some tentative answers. Tilman found that plots with more species showed less year-to-year variation in total biomass. He also showed that in his experiments, increased diversity contributed to higher productivity.

(NEW NCERT 12th Page No. 221)**104. (3)**

The current species extinction rates are estimated to be 100 to 1,000 times faster than in the pre-human times and our activities are responsible for the faster rates. Ecologists warn that if the present trends continue, nearly half of all the species on earth might be wiped out within the next 100 years.

(NEW NCERT 12th Page No. 222)**105. (4)**

Nearly 25 per cent of all insects are known to be *phytophagous* (feeding on plant sap and other parts of plants).

(NEW NCERT 12th Page No. 198)**106. (3)**

The electrons that were moved from photosystem II must be replaced. This is achieved by electrons available due to splitting of water. The splitting of water is associated with the PS II; water is split into $2H^+$, $[O]$ and electrons. This creates oxygen, one of the net products of photosynthesis.

(NEW NCERT 11th Page No. 139)**107. (4)**

Co-extinction takes place when a species becomes extinct, the plant and animal species associated with it in an obligatory way also become extinct. When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate. Another example is the case of a coevolved plant-pollinator mutualism where extinction of one invariably leads to the extinction of the other.

(NEW NCERT 12th Page No. 223)**108. (2)**

Zoological parks, botanical gardens and wildlife safari are *ex-situ* methods of conservation of biodiversity.

(NEW NCERT 12th Page No. 225)**109. (4)**

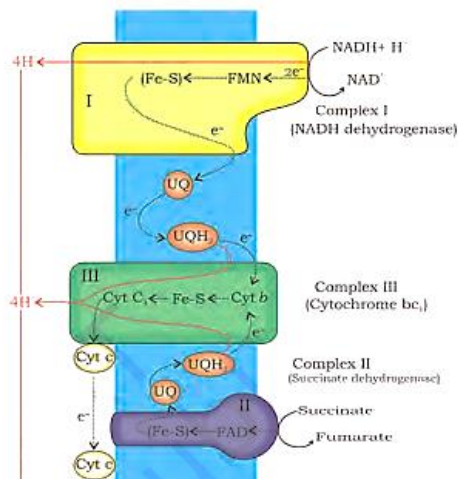
A single species might show high diversity at the genetic level over its distributional range. This is called genetic diversity. The genetic variation shown by the medicinal plant *Rauwolfia vomitoria* growing in different Himalayan ranges might be in terms of the potency and concentration of the active chemical (reserpine) that the plant produces.

(NEW NCERT 12th Page No. 217)**110. (1)**

The detritus food chain (DFC) begins with dead organic matter. It is made up of decomposers which are heterotrophic organisms, mainly fungi and bacteria. They meet their energy and nutrient requirements by degrading dead organic matter or detritus. These are also known as saprotrophs (*sapro*: to decompose). Decomposers secrete digestive enzymes that breakdown dead and waste materials into simple, inorganic materials, which are subsequently absorbed by them.

(NEW NCERT 12th Page No. 210)

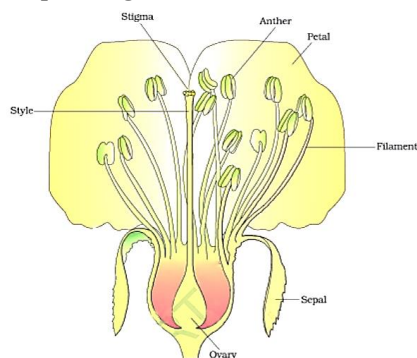
111. (3)



(NEW NCERT 11th Page No. 160)

112. (3)

‘C’ is the anther that breaks open on maturation to release pollen grains.



(NEW NCERT 12th Page No. 4)

113. (1)

The exponential growth of a plant can be expressed as;

$$W_1 = W_0 e^{rt}$$

W_1 = final size (weight, height, number etc.)

W_0 = initial size at the beginning of the period

r = growth rate

t = time of growth

e = base of natural logarithms

(NEW NCERT 11th Page No. 170)

114. (3)

Habitat loss	Cutting forest for growing soya beans
Over-exploitation	Extinction of Steller's Sea Cow
Alien species invasion	Invasive growth of <i>Eichhornia</i>
Co-extinction	Extinction of a parasite with the extinction of its host

(NEW NCERT 12th Page No. 222, 223)

115. (1)

With increasing resources put into ‘bioprospecting’ (exploring molecular, genetic and species-level diversity for products of economic importance), nations endowed with rich biodiversity can expect to reap enormous benefits. Amazon forest is estimated to produce, through photosynthesis, 20 per cent of the total oxygen in the earth’s atmosphere.

(NEW NCERT 12th Page No. 223, 224)

116. (2)

The broadly utilitarian argument says that biodiversity plays a major role in many ecosystem services that nature provides. Pollination (without which plants cannot give us fruits or seeds) is another service, ecosystems provide through pollinators layer – bees, bumblebees, birds and bats. What will be the costs of accomplishing pollination without help from natural pollinators? There are other intangible benefits – that we derive from nature – the aesthetic pleasures of walking through thick woods, watching spring flowers in full bloom or waking up to a bulbul’s song in the morning. Obtaining resins from the tree is a narrowly utilitarian reason for biodiversity conservation.

(NEW NCERT 12th Page No. 223, 224)

117. (1)

Invariably, the number of species waiting to be saved from extinction far exceeds the conservation resources available. On a global basis, this problem has been addressed by eminent conservationists. They identified for maximum protection certain ‘biodiversity hotspots’ regions with very high levels of species richness and high degree of endemism (that is, species confined to that region and not found anywhere else).

(NEW NCERT 12th Page No. 224)

118. (4)

The historic Convention on Biological Diversity (‘The Earth Summit’) held in Rio de Janeiro in 1992, called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits. In a follow-up, the World Summit on Sustainable Development held in 2002 in Johannesburg, South Africa, 190 countries pledged their commitment to achieve by 2010, a significant reduction in the current rate of biodiversity loss at global, regional and local levels.

(NEW NCERT 12th Page No. 225)

119. (1)
Initially 25 biodiversity hotspots were identified but subsequently nine more have been added to the list, bringing the total number of biodiversity hotspots in the world to 34.

(NEW NCERT 12th Page No. 224)

120. (3)

<i>Mangifera</i>	Genus
<i>indica</i>	Species
Felidae	Family
Mammalia	Class

(NEW NCERT 11th Page No. 7)

121. (2)

In many cultures, tracts of forest were set aside, and all the trees and wildlife within were venerated and given total protection which are called as sacred grooves.

(NEW NCERT 12th Page No. 225)

122. (4)

In recent years *ex situ* conservation has advanced beyond keeping threatened species in enclosures. Now gametes of threatened species can be preserved in viable and fertile condition for long periods using cryopreservation techniques, eggs can be fertilised *in vitro*, and plants can be propagated using tissue culture methods. Seeds of different genetic strains of commercially important plants can be kept for long periods in seed banks.

(NEW NCERT 12th Page No. 225)

123. (3)

The historic Convention on Biological Diversity ('The Earth Summit') held in Rio de Janeiro in 1992, called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits.

(NEW NCERT 12th Page No. 225)

124. (1)

Bacteria reproduce mainly by fission. They also reproduce by a sort of sexual reproduction by adopting a primitive type of DNA transfer from one bacterium to the other.

(NEW NCERT 11th Page No. 14)

125. (3)

In conjoint type of vascular bundles, the xylem and phloem are jointly situated along the same radius of vascular bundles. Such vascular bundles are common in stems and leaves. In the monocotyledons, the vascular bundles have no cambium present in them. Hence, since they do not form secondary tissues, they are referred to as

closed. Conjoint closed vascular bundle is present in monocot stems and leaves.

(NEW NCERT 11th Page No. 73)

126. (4)

Tropical environments, unlike temperate ones, are less seasonal, relatively more constant and predictable. Such constant environments promote niche specialisation and lead to a greater species diversity.

(NEW NCERT 12th Page No. 220)

127. (2)

During his pioneering and extensive explorations in the wilderness of South American jungles, the great German naturalist and geographer Alexander von Humboldt observed that within a region species richness increased with increasing explored area, but only up to a limit. In fact, the relation between species richness and area for a wide variety of taxa (angiosperm plants, birds, bats, freshwater fishes) turns out to be a rectangular hyperbola.

(NEW NCERT 12th Page No. 220)

128. (1)

The IUCN Red List (2004) documents the extinction of 784 species (including 338 vertebrates, 359 invertebrates and 87 plants) in the last 500 years.

(NEW NCERT 12th Page No. 221)

129. (3)

The recent threat to indigenous catfish due to the illegal introduction of African catfish, *Clarias gariepinus* for aquaculture purpose is an example of biodiversity loss by alien species invasion.

(NEW NCERT 12th Page No. 223)

130. (1)

The Mycoplasma are the smallest living cells known and are prokaryotic organisms.

(NEW NCERT 11th Page No. 88)

131. (1)

Leptotene	Initiation of compaction of chromosomes
Zygotene	Synapsis occurs
Pachytene	Appearance of recombination nodules
Diakinesis	Terminalisation of chiasmata
Diplotene	Separation of homologous chromosomes except at the sites of crossing over

(NEW NCERT 11th Page No. 126)

132. (1)

In India, ecologically unique and biodiversity-rich regions are legally protected as biosphere reserves, national parks and sanctuaries. India now has 14 biosphere reserves, 90 national parks and 448 wildlife sanctuaries.

(NEW NCERT 12th Page No. 225)

133. (3)

In *ex-situ* approach of conservation of biodiversity, threatened animals and plants are taken out from their natural habitat and placed in special setting where they can be protected and given special care. In recent years *ex-situ* conservation has advanced beyond keeping threatened species in enclosures.

(NEW NCERT 12th Page No. 225)

134. (2)

India has also a history of religious and cultural traditions that emphasised protection of nature. In many cultures, tracts of forest were set aside, and all the trees and wildlife within were venerated and given total protection. Such sacred groves are found in Khasi and Jaintia Hills in Meghalaya, Aravalli Hills of Rajasthan, Western Ghat regions of Karnataka and Maharashtra and the Sarguja, Chanda and Bastar areas of Madhya Pradesh. In Meghalaya, the sacred groves are the last refuges for a large number of rare and threatened plants.

(NEW NCERT 12th Page No. 225)

135. (4)

The colonisation of tropical Pacific Islands by humans is said to have led to the extinction of more than 2,000 species of native birds.

(NEW NCERT 12th Page No. 221)

SECTION-B

136. (2)

Dodo	Mauritius
Quagga	Africa
Thylacine	Australia
Steller's Sea Cow	Russia

(NEW NCERT 12th Page No. 221)

137. (3)

The narrowly utilitarian arguments for conserving biodiversity are obvious; humans derive countless

direct economic benefits from nature-food (cereals, pulses, fruits), firewood, fibre, construction material, industrial products (tannins, lubricants, dyes, resins, perfumes) and products of medicinal importance. Pollination comes under broadly utilitarian arguments for conserving biodiversity.

(NEW NCERT 12th Page No. 223)

138. (2)

In general, loss of biodiversity in a region may lead to (a) decline in plant production, (b) lowered resistance to environmental perturbations such as drought and (c) increased variability in certain ecosystem processes such as plant productivity, water use, and pest and disease cycles.

(NEW NCERT 12th Page No. 222)

139. (3)

'Rivet popper hypothesis' is given by Stanford ecologist Paul Ehrlich to explain importance of species richness for the well-being of an ecosystem. In an airplane (ecosystem) all parts are joined together using thousands of rivets (species). If every passenger travelling in it starts popping a rivet to take home (causing a species to become extinct), it may not affect flight safety (proper functioning of the ecosystem) initially, but as more and more rivets are removed, the plane becomes dangerously weak over a period of time. Furthermore, which rivet is removed may also be critical. Loss of rivets on the wings (key species that drive major ecosystem functions) is obviously a more serious threat to flight safety than loss of a few rivets on the seats or windows inside the plane.

(NEW NCERT 12th Page No. 221)

140. (3)

Large holes in 'Swiss cheese' are due to production of a large amount of CO₂ by a bacterium named *Propionibacterium sharmanii*.

(NEW NCERT 12th Page No. 151)

141. (2)

Haemophilia is a X linked recessive disorder. Down's Syndrome and Turner's Syndrome are chromosomal disorders. Sickle-cell anaemia is an autosome linked recessive disease.

(NEW NCERT 12th Page No. 74)

142. (2)

In our biosphere immense diversity (or heterogeneity) exists not only at the species level but at all levels of biological organisation ranging from macromolecules within cells to biomes. Biodiversity is the term popularised by the sociobiologist Edward Wilson to describe the combined diversity at all the levels of biological organisation.

(NEW NCERT 12th Page No. 217)

143. (1)

The commonly used vectors in sequence annotation were BAC (bacterial artificial chromosome) and YAC (yeast artificial chromosome). According to the results obtained through HGP, chromosome 1 has most genes (2968) and the chromosome Y has the fewest (231).

(NEW NCERT 12th Page No. 103, 104)

144. (1)

Humans have always depended on nature for food and shelter, but when 'need' turns to 'greed', it leads to over-exploitation of natural resources. Many species extinctions in the last 500 years (Steller's sea cow, passenger pigeon) were due to overexploitation by humans. Presently many marine fish populations around the world are over harvested, endangering the continued existence of some commercially important species. When alien species are introduced unintentionally or deliberately for whatever purpose, some of them turn invasive, and cause decline or extinction of indigenous species. The Nile perch introduced into Lake Victoria in east Africa led eventually to the extinction of an ecologically unique assemblage of more than 200 species of cichlid fish in the lake. Threat posed to our native species by invasive weed species like carrot grass (*Parthenium*), *Lantana* and water hyacinth (*Eicchornia*) is due to alien species invasions.

(NEW NCERT 12th Page No. 222, 223)

145. (2)

In bryophytes, the sporophyte is not free-living but attached to the photosynthetic gametophyte and derives nourishment from it.

(NEW NCERT 11th Page No. 29)

146. (4)

More than 70 per cent of all the species recorded are animals, while plants (including algae, fungi, bryophytes, gymnosperms and angiosperms) comprise no more than 22 per cent of the total. Among animals, insects are the most species-rich taxonomic group, making up more than 70 per cent of the total. That means, out of every 10 animals on this planet, 7 are insects. The number of fungi species in the world is more than the combined total of the species of fishes, amphibians, reptiles and mammals.

(NEW NCERT 12th Page No. 218)

147. (2)

The calyx is the outermost whorl of the flower and the members are called sepals. Generally, sepals are green, leaf like and protect the flower in the bud stage. The calyx may be gamosepalous (sepals united) or polysepalous (sepals free).

(NEW NCERT 11th Page No. 63)

148. (3)

The largely tropical Amazonian rain forest in South America has the greatest biodiversity on earth- it is home to more than 40,000 species of plants, 3,000 of fishes, 1,300 of birds, 427 of mammals, 427 of amphibians, 378 of reptiles and of more than 1,25,000 invertebrates.

(NEW NCERT 12th Page No. 219)

149. (2)

According to a more conservative and scientifically sound estimate made by Robert May, the global species diversity is about 7 million.

(NEW NCERT 12th Page No. 217)

150. (2)

The ethical argument for conserving biodiversity relates to what we owe to millions of plant, animal and microbe species with whom we share this planet. Philosophically or spiritually, we need to realise that every species has an intrinsic value, even if it may not be of current or any economic value to us. We have a moral duty to care for their well-being and pass on our biological legacy in good order to future generations.

(NEW NCERT 12th Page No. 224)

(ZOOLOGY)**SECTION-A****151. (4)**

Theory of special creation has three connotations. One, that all living organisms (species or types) that we see today were created as such. Two, that the diversity was always the same since creation and will be the same in future also. Three, that earth is about 4000 years old.

(NEW NCERT 12th Page No. 112)**152. (1)**

Use of agrochemicals such as fertilisers, herbicides, insecticides and pesticides along with use of better management practises have resulted in increased crop yields.

(NEW NCERT 12th Page No. 178)**153. (1)**

All the existing life forms share similarities and share common ancestors. However, these ancestors were present at different periods in the history of earth (epochs, periods and eras).

(NEW NCERT 12th Page No. 113)**154. (2)**

List-I	List-II
Tetanus	Antitoxin
IgA	Colostrum
IgE	Allergy
Chikungunya	<i>Aedes</i>

(NEW NCERT 12th Page No. 130, 134, 135)**155. (3)**

Homology indicates common ancestry. Homology is based on divergent evolution whereas analogy refers to a situation exactly opposite. Paleontological evidences explain fossils.

(NEW NCERT 12th Page No. 114, 115)**156. (4)**

Both LH and FSH attain a peak level in the middle of cycle (about 14th day). Rapid secretion of LH leading to its maximum level during the mid-cycle called LH surge induces rupture of Graafian follicle and thereby the release of ovum (ovulation). Level of progesterone increases during secretory phase.

(NEW NCERT 12th Page No. 35)**157. (2)**

Lemur is an example of placental mammal whereas Bandicoot, Koala and Wombat are examples of Australian marsupials.

(NEW NCERT 12th Page No. 117, 118)**158. (3)**

In amniocentesis some of the amniotic fluid of the developing foetus is taken to analyse the fetal cells and dissolved substances. This procedure is used to test for the presence of certain genetic disorders such as, down syndrome, haemophilia, sickle-cell anaemia, etc., determine the survivability of the foetus. This technique has been misused to illegally check the sex of unborn foetus and leads to increase in female foeticide. Statutory ban on amniocentesis has been imposed in India to check illegal female foeticide.

(NEW NCERT 12th Page No. 42)**159. (2)**

In 1983, Eli Lilly an American company prepared two DNA sequences corresponding to A and B, chains of human insulin and introduced them in plasmids of *E. coli* to produce insulin chains. Chains A and B were produced separately, extracted and combined by creating disulfide bonds to form human insulin.

(NEW NCERT 12th Page No. 182)**160. (2)**

The essence of Darwinian theory about evolution is natural selection. The rate of appearance of new forms is linked to the life cycle or the life span.

(NEW NCERT 12th Page No. 118)**161. (3)**

Construction of first rDNA by linking a gene encoding antibiotic resistance with native plasmid of *Salmonella typhimurium* was done by Stanley Cohen and Herbert Boyer.

(NEW NCERT 12th Page No. 164)**162. (3)**

Branching descent and natural selection are the two key concepts of Darwinian Theory of Evolution. Some organisms are better adapted to survive in an otherwise hostile environment. Adaptive ability is inherited. It has a genetic basis. Fitness is the end result of the ability to adapt and get selected by nature.

(NEW NCERT 12th Page No. 118)**163. (2)**

Nucleic acid is the genetic material of all organisms without exception. In majority of organisms genetic material is deoxyribonucleic acid or DNA.

(NEW NCERT 11th Page No. 106)

164. (2) <i>Bt</i> toxin is produced by a bacterium called <i>Bacillus thuringiensis</i> (<i>Bt</i> for short). <i>Bt</i> toxin gene has been cloned from the bacteria and been expressed in plants to provide resistance to insects without the need for insecticides; in effect created a bio-pesticide. (NEW NCERT 12th Page No. 179) 165. (4) EcoRI cut the DNA between bases G and A only when the sequence GAATTC is present in the DNA. (NEW NCERT 12th Page No. 165, 166) 166. (1) Five factors are known to affect Hardy-Weinberg equilibrium. These are gene migration or gene flow, genetic drift, mutation, genetic recombination and natural selection. (NEW NCERT 12th Page No. 121) 167. (1) Annelida exhibit organ-system level of body organisation and bilateral symmetry. They are triploblastic, metamerically segmented and coelomate animals. (NEW NCERT 11th Page No. 43) 168. (3) ADA deficiency can be cured in some children by bone marrow transplantation; in others it can be treated by enzyme replacement therapy, in which functional ADA is given to the patient by injection. (NEW NCERT 12th Page No. 182) 169. (3) Restriction enzymes are isolated from bacteria not from viruses. When cut by the same restriction enzyme, the resultant DNA fragments have the same kind of ‘sticky-ends’ and, these can be joined together (end-to-end) using DNA ligases. (NEW NCERT 12th Page No. 165, 167) 170. (1) The correct order of layers of an ovum from outside to inside is: Corona radiata, Zona pellucida and Vitelline membrane. (NEW NCERT 12th Page No. 35) 171. (1) In PCR, multiple copies of the gene of interest are synthesised <i>in vitro</i> using two sets of primers and the enzyme DNA polymerase. The enzyme extends the primers using the nucleotides provided in the reaction and the genomic DNA as template. If the	process of replication of DNA is repeated many times, the segment of DNA can be amplified to approximately billion times. The amplified fragment if desired can now be used to ligate with a vector for further cloning. (NEW NCERT 12th Page No. 173) 172. (1) As a first step towards gene therapy, lymphocytes from the blood of the patient are grown in a culture outside the body. (NEW NCERT 12th Page No. 182) 173. (2) The cuboidal epithelium is composed of a single layer of cube-like cells. This is commonly found in ducts of glands and tubular parts of nephrons in kidneys and its main functions are secretion and absorption. The epithelium of proximal convoluted tubule (PCT) of nephron in the kidney has microvilli. (Old NCERT 11th Page No. 101) 174. (3) Restriction in restriction enzyme refers to prevention of the multiplication of bacteriophage in bacteria. In the bacterial cell, restriction enzymes cleave foreign DNA, thus eliminating infecting organisms. (NEW NCERT 12th Page No. 165) 175. (3) The first non-cellular forms of life could have originated 3 billion (3000 millions) years back. About 2000 million years ago (mya) the first cellular forms of life appeared on earth. Difference = 3000 – 2000 = 1000 million years (NEW NCERT 12th Page No. 111, 121) 176. (3) Cofactor is a non-protein constituent that is bound to the the apoenzyme to make the enzyme catalytically active. (NEW NCERT 11th Page No. 117) 177. (3) Using conventional methods of diagnosis (serum and urine analysis, etc.) early detection is not possible. Recombinant DNA technology, Polymerase Chain Reaction (PCR) and Enzyme Linked Immuno-sorbent Assay (ELISA) are some of the techniques that serve the purpose of early diagnosis. (NEW NCERT 12th Page No. 182) 178. (4) Recombinant DNA molecule required restriction endonuclease, DNA ligase, DNA fragments but does not require <i>E.coli</i>. (NEW NCERT 12th Page No. 171)
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179. (2)

Transgenic animals that produce useful biological products can be created by the introduction of the portion of DNA (or genes) which codes for a particular product such as human protein (α -1-antitrypsin) used to treat emphysema.

(NEW NCERT 12th Page No. 184)

180. (2)

The maximum volume of air a person can breathe in after a forced expiration is called vital capacity. This includes ERV, TV and IRV. Volume of air that will remain in the lungs after a normal expiration is called functional residual capacity. This includes ERV + RV. Total volume of air a person can inspire after a normal expiration is called inspiratory capacity.

(NEW NCERT 11th Page No. 187)

181. (1)

About 65 mya, the dinosaurs suddenly disappeared from the earth. We do not know the true reason. Some say climatic changes killed them. Some say most of them evolved into birds. The truth may lie in between.

(NEW NCERT 12th Page No. 124)

182. (4)

The first heart sound (lub) is associated with the closure of the tricuspid and bicuspid valves whereas the second heart sound (dub) is associated with the closure of the semilunar valves.

(NEW NCERT 11th Page No. 200)

183. (1)

List-I	List-II
Rosie	First transgenic cow
Golden rice	Genetically modified plant
ADA gene therapy	Genetically engineered lymphocytes
Insulin chain	rDNA technique

(NEW NCERT 12th Page No. 182, 184)

184. (2)

The convention for naming restriction enzymes is the first letter of the name comes from the genus and the second two letters come from the species of the prokaryotic cell from which they were isolated.

(NEW NCERT 12th Page No. 165)

185. (2)

The hypothalamus is the basal part of diencephalon, forebrain and it regulates a wide spectrum of body functions. It contains several groups of neurosecretory cells called nuclei which produce hormones. These hormones regulate the synthesis and secretion of pituitary hormones.

(NEW NCERT 11th Page No. 239, 240)

SECTION-B

186. (2)

List-I	List-II
Origin of universe	20 bya
Origin of earth	4.5 bya
Appearance of life after the formation of earth	4 bya
First cellular form of life	2000 mya

(NEW NCERT 12th Page No. 111)

187. (3)

Progestogens alone or in combination with estrogen can also be used by females as injections or implants under the skin. Their mode of action is similar to that of pills and their effective periods are much longer. Administration of progestogens or progestogen-estrogen combinations or IUDs within 72 hours of coitus have been found to be very effective as emergency contraceptives as they could be used to avoid possible pregnancy due to rape or casual unprotected intercourse.

(NEW NCERT 12th Page No. 45)

188. (3)

The Big Bang theory attempts to explain to us the origin of universe. It talks of a singular huge explosion unimaginable in physical terms. The universe expanded and hence, the temperature came down. Hydrogen and Helium formed sometime later. The gases condensed under gravitation and formed the galaxies of the present day universe.

(NEW NCERT 12th Page No. 111)

189. (2)

Formation of life was preceded by chemical evolution, i.e., formation of diverse organic molecules from inorganic constituents.

(NEW NCERT 12th Page No. 111)

190. (4)

Evolution is not a directed process in the sense of determinism. It is a stochastic process based on chance events in nature and chance mutation in the organisms.

(NEW NCERT 12th Page No. 116)

- 191. (1)**
Restriction enzymes belong to a larger class of enzymes called nucleases. These are of two kinds; exonucleases and endonucleases. Exonucleases remove nucleotides from the ends of the DNA whereas, endonucleases make cuts at specific positions within the DNA.
(NEW NCERT 12th Page No. 166)
- 192. (3)**
B. thuringiensis forms protein crystals during a particular phase of their growth. These crystals contain a toxic insecticidal protein. The *Bt* toxin protein exist as inactive protoxins but once an insect ingest the inactive toxin, it is converted into an active form of toxin due to the alkaline pH of the gut of insects which solubilise the crystals.
(NEW NCERT 12th Page No. 179)
- 193. (4)**
Hypothalamic hormones originating in the hypothalamic neurons, pass through axons and are released from their nerve endings. These hormones reach the pituitary gland through a portal circulatory system and regulate the functions of the anterior pituitary. The posterior pituitary is under the direct neural regulation of the hypothalamus.
(NEW NCERT 11th Page No. 240)
- 194. (1)**
Spermatogenesis and oogenesis both are controlled by LH and FSH hormone, both forms haploid gametes. In oogenesis, differentiation of gamete does not occurs after meiosis. In oogenesis meiosis does not occurs continuously. Oogenesis is initiated during the embryonic development stage.
(NEW NCERT 12th Page No. 32)
- 195. (2)**
RNAi takes place in all eukaryotic organisms as a method of cellular defense. This method involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA (silencing).
(NEW NCERT 12th Page No. 180)
- 196. (2)**
Males cockroach bear a pair of short, thread- like anal styles (also known as caudal style) which are absent in females. In both sexes, the 10th segment bears a pair of jointed filamentous structures called anal cerci.
(Old NCERT 11th Page No. 112)
- 197. (4)**
Hollow and pneumatic bones is present in Aves. *Neophron* belongs to class Aves. *Hemidactylus* belongs to class Reptilia. *Macropus* and *Ornithorhynchus* belongs to class Mammalia.
(NEW NCERT 11th Page No. 49)
- 198. (3)**
Heroin is a depressant and slows down body functions. *Datura* has hallucinogenic properties. Drugs like barbiturates, amphetamines, benzodiazepines, and other similar drugs, that are normally used as medicines to help patients cope with mental illnesses like depression and insomnia. Tobacco contains a large number of chemical substances including nicotine, an alkaloid.
(NEW NCERT 12th Page No. 142, 143)
- 199. (3)**
Using *Agrobacterium* vectors, nematode-specific genes were introduced into the host plant. The introduction of DNA was such that it produced both sense and anti-sense RNA in the host cells.
(NEW NCERT 12th Page No. 180)
- 200. (4)**
Agarose gel electrophoresis is commonly used in molecular biology to separate DNA fragments based on their size. When an electric current is applied to the gel, DNA molecules migrate through the pores of the gel at a rate determined by their size. This allows researchers to visualize and analyze the sizes of DNA fragments in a sample.
(NEW NCERT 12th Page No. 168)

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